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ABSTRACT

Descriptions of global education tend to be either fragmented or nebulous. Consequently, the educator is left with little tangible basis for developing instructional programs. As a corrective measure, this paper advocates using fundamental ideas from the disciplines of geography and environmental sociology that collectively contribute to the formation of 'human ecology' as a suprastructure for the analysis of current issues that are critical to global well-being. By arranging related concepts on a flow chart and factoring out secondary issues, the resulting cohesive structure reveals interrelated human and environmental factors that interface with the social, physical, and natural sciences. A 15-item list of references is included. (Author/DB)

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Abstract

Descriptions of global education have tended to be either fragmented or nebulous. The educator is, consequently, left with little tangible basis for developing an instructional program. As a corrective measure, this paper advocates using the fundamental ideas from the fields of geography and environmental sociology, that collectively contribute to the formation of 'human ecology,' as a suprastructure for the analysis of current issues that are critical to global well-being. By arranging related concepts on a flow chart, and factoring out subservient issues, the resulting cohesive structure reveals interrelated human/environmental factors that interface the social, physical and natural sciences.

Human Ecology: A Suprastructure for Global Education

The rate at which 'global education' appears as the focus for scholarly papers, journal articles and professional conferences leads to the conclusion that it is a timely, even critical, issue that should be addressed by teacher education programs. Use of the 'global education' concept has, however, created a semantic dilemma for at least two reasons. First, advocacy statements have tended to be of a general nature and rely on implied meanings to gain support (i.e., "We all live in the same world."). Consequently, vague representations of global education have contributed to a state of bewilderment and have failed to provide a tangible basis for curriculum development. Although the existing discourse represents an orientation toward instructiional programming, it lacks a sense of curricular structure. Second, it is apparent that different organizations (i.e., peace groups, international business conglomerates and environmentalist), who use the global education rubric, do not share the same primary motives or a common agenda. The issues projected by various interest groups contribute to the state of confusion surrounding the critical features of the global education concept, and it's curricular implications. This condition accentuates the need for a systematic approach to the delineation of substantive content, and its implementation.

In an effort to clarify conceptual ambiguity, the National Council for the Social Studies produced a position statement in 1982. The focus of that statement, emphasizing the interrelatedness of physical and social factors operating within the biosphere. The quest for a homeostatic environment distinguishes one approach to global education

from associated instructional modules within the existing school curriculum (i.e., world history, world literature). That is, earth should be viewed as a single system composed of interrelated elements. Despite the capacity of humans to reshape and control the environment, they are still an integral part of the natural world and risk survival as a species when this basic fact is ignored.

Unfortunately, movement toward intrabiospheric equity is antithetical to the fundamental Judaeo-Christian directive that humans should, "Be fruitful and multiply, and fill the earth and subdue it; and have dominion over the fish of the sea and over the birds of the air and over every living thing that moves upon the earth (Genesis, 1. 28)." The perception of man as the righteous, top consumer in any resource chain provides justification for maximizing immediate, short-term profits. There seems to be a blind faith in the ability of science and technology to compensate for human negligence. Understandably, it is difficult for a group of people living in the midst of abundant resources, and having a high productive capacity, to identify with those who have no choice but to exist on significantly less. In addition to the orientation of humans as separate from everything else in an ecosystem, what sociologists William Catton and Riley Dunlap (1980) identify as the 'Human Exemptionalism Paradigm,' global ecology is also in conflict with the conservative mind-set that equates provincialism and protectionist policies with patriotism. Despite suggestions to the contrary, the pursuit of global equilibrium is not a conspiracy to destroy national identities. In fact, one can support global well-being on strictly egocentric motives. For the single, overwhelming argument in favor of eliminating the preferred status of selected human consumer groups is survival of the species.

It is only within the past four or five years that concern for the biosphere has extended beyond what might be considered 'hardcore organizations.' Publications, such as the Global 2000 Report (1982), Our Common Future (1987) and the State of the World (1988), make it very clear that human social welfare can not be separated from environmental factors; to do so is to engage in self-destructive behavior. It is, therefore, incumbent upon teacher education programs to identify and stress the global interrelatedness of science and social studies. Such a union is supported by recommendations stemming from the First Intergovernmental Conference on Environmental Education which was convened in Tbilisi, Georgia (USSR) in 1977. Twenty-two years later, the notion remains in tact, but undeveloped.

Bubee and Mau (1986) surveyed two hundred sixty-two science educators representing forty-one countries with the goal of determining the extent to which they were teaching global problems related to science and technology. The survey determined that there is a general lack of information regarding the possible function of education on international issues. Participants indicated that world hunger, population growth, air quality, water resources, war technology and human health were the most pressing global issues. They also noted that population growth was a causal factor for all other problems. Over 50% of the participants indicated that they were only slightly knowledgeable about world hunger (the top ranked issue). Fortunately, 73% of the respondents recommended that the science and social studies aspects of the science technology and society category be incorporated into one course. An analysis of the survey suggested a number of policy recommendations. Of particular interest was the need to

research and develop models for integrating science and socials studies.

A model for implementing the integration of natural, physical and social sciences already exists within the fields of geography and environmental sociology. When the first departments of geography were established in U.S. universities shortly after the turn of the century, they were perceived to function as bridges between the natural and social sciences (Manners & Mikesell, 1974). Although the 'environmentalist' orientation was replaced by distributional or locational studies, the original focus of geography established a precedent for the study of mutual relations between people and their natural environment or 'human ecology.' More recently, the Geographic Education National Implementation Project produced K-6 Geography Themes, Key Ideas and Learning Opportunities (1987) which is consistent with the original focus of geography and can be utilized as a component within the study of human ecology. The major limitation of the GENIP is that it is based on Hanna's 'expanding environments' model (1963) that doesn't introduce non-American units of study until the upper elementary grades. A desirable alternative, from a global education perspective, is described by Hartoonian and Laughlin (1986) in which themes are introduced in kindergarten and developed over subsequent levels through twelfth grade. Hartoonian and Laughlin's use of the thematic continuum accommodates Bruner's (1960) premise that the structure of a discipline can be taught to any child if it is placed in an appropriate context. The model also takes advantage of young children's exposure to the 'world concept' derived from television and books. Consequently, the fundamental ideas of global human ecology can be adapted to the full range of student abilities found in public

schools, as well as in teacher education programs. The task that remains is the identification of concepts, generalizations and principles from human ecology that help explain current global issues. Once identified, the fundamental ideas can be structured according to the complexity of relationships, antecedents of instruction and the abilities of various student populations.

The study of human ecology has resulted in the identification of stimulus-response patterns that persist over time and from region to region. The resulting principles and generalizations form a suprastructure against which specific current situations can be compared, as well as serving as a basis for making predictions and hypotheses about new situations. For example, the following three sequential principles from Campbell's (1983) Human Ecology serve as a reference for analyzing the practice, and consequences, of deforestation, particularly as it applies to regions such as the Sahel of Africa.

1st Prin. As people move away from the biotic diversity of tropical environments they become increasingly dependent on complex social structures and the development of technology.

2nd Prin. A reduction in biotic diversity increases the use of existing resources because alternatives are not available.

3rd Prin. When the size and/or the consumption patterns of a population exceeds the productive capacity of existing resources the complete ecosystem is placed at risk.

Consequently: Humans cut down trees for:

1. Lumber
2. Fuel
3. Paper and
4. Agricultural land

Resulting in Deforestation.

Deforestation becomes the focal issue from which antecedent and subsequent factors can be graphicly displayed and readily identified. By factoring the focal issue, a working flow chart or relational web is produced (Figure 1). It should be noted that social, natural and physical science categories occur within the display. Each time the components are analyzed, and reflected upon, new possibilities for extending the curriculum occur.

Approximatly a fourth of CO_2 released into the atmosphere is the result of deforestation. The significance of CO_2 release is probably too complex and abstract an issue for primary school children, but the role of CO_2 in the 'greenhouse effect' suggests several antecedent concepts. For example, young children need to understand the concept of 'cycles' because it is a fundamental idea that transfers across a variety of science and social studies topics. One may choose to introduce this concept with the cycle of seasons, or the cycle of life, followed by the hydrologic cycle. Once students understand how and why the hydrologic cycle operates, the concept can be used in relation to: climate, erosion, water contamination, and changes of rainfall resulting from global warming. At a more advanced level the nitrogen,

phosphorous and sulfur cycles can be associated with various forms of contamination and the social factors contributing to their detrimental effects. Thus the concept of cycles serves as a starting point for what approximates a logical sequence of instruction progressing from simple to complex categories.

A study of the hydrologic cycle also introduces students to transformations between states of matter including, water's gaseous form. Experiences delineating the properties of another gas, air, can be generalized and applied to student's understanding of previously mentioned gas cycles. The warming and cooling of air, resulting in areas of high and low pressure, leads to the study of climate and weather patterns. Since climate is a major factor in determining the distribution of plants and animals, students should then be able to hypothesize why, for example, the colonial British preferred to settle in Kenya rather than Nigeria. The climate/habitat relationship would subsequently help explain why post-colonial conflict in Kenya was between indiginious groups and Westerners, while in Nigeria the struggle was between contrasting indiginious groups. It should be apparent at this point that substantive knowledge in science is not an end in itself, but serves as a means for explaining social 'puzzles.'

In the process of understanding how atmospheric CO_2 contributes to global warming it would be beneficial to assess the properties of light, it's polarization, and duel nature. It may be desirable to replicate Pasteur's experiments with polarizing crystals (a process used in the 19th century to discover chemical structures). The idea of a duel theory introduces still a different avenue of pursuit; how a single physical phenomenon can exhibit two different physical states. How can light behave as rays in one context while in a different

situation function as particles. Are there any parallels in the social sciences?

African soils in the Sahel are particularly vulnerable to the process of desertification. The stability of soil in this region is dependent on a sustained protective cover of vegetation. Growing human and animal populations, coupled with unfavorable climatic conditions, have led to land degradation by excessive grazing, cropping and gathering of fuelwood (Note the application of Principles 2 & 3 from Campbell). In recent years, Sudan was able to increase its per capita food production, against the general regional trend of decline, by increasing the area under cultivation (Utilizing marginal lands). However, the yields of both cereals and root crops declined (Harrison, 1987). Once the expansion into marginal lands reaches its limit, progress halts and productive capacity declines. The mismatch between the rate of human consumption due to population size and the productive capacity of the land is futher complicated by economic and political factors. In 1988, for example, 250,000 inhabitants of Sudan died of starvation, primarily in the rainy months between May and October when inhabitants in the south were denied imported food by both rebel and government forces. Land degradation resulting in an inadequate food supply effects, and is effected by the interplay of natural and human actions. It should be noted that the factors over which humans have direct control include, the rapid growth of human and animal populations, detrimental land use practices (especially deforestation), adverse terms of trade and civil strife (World Commission on Environment and Development, (1987).

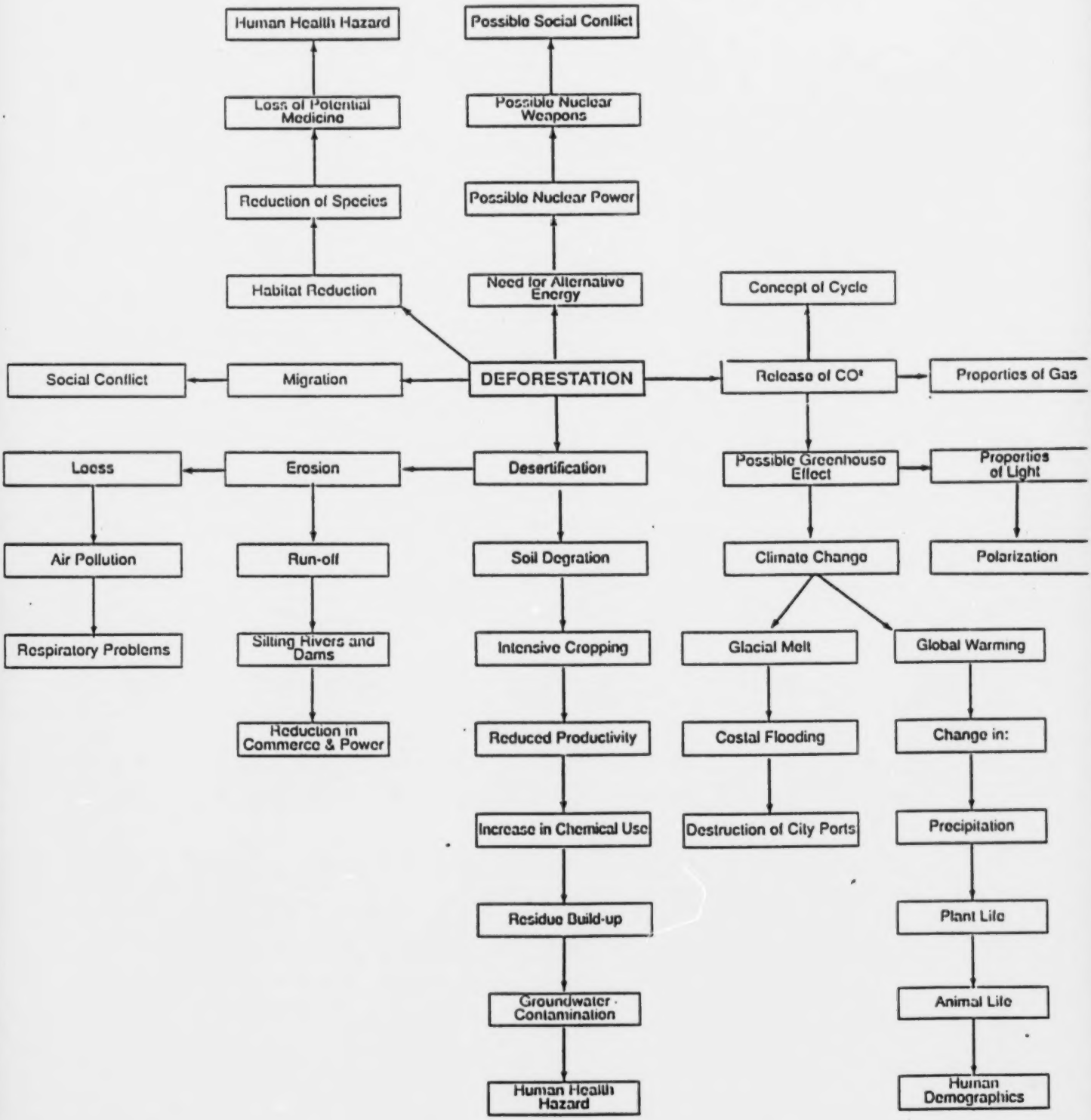
The flow chart identifies categorical content, but does not specificly indicate appropriate instructional strategies or target

student populations. However, an experienced elementary classroom teacher with an extensive background in children's literature may readily associate the concept of deforestation with Dr. Seuss' The Lorax (1971). There are, of course, additional values and concepts introduced in this outstanding environmental statement; not the least of which is overconsumption. Still another example of human egocentrism and consumption is found in Shel Shilversten's The Giving Tree (1964). Both of these tradebooks have been used effectively with first grade children. Consequently, the process of associating an idea with its means of development may automaticlly results in the identification of a target population.

Teachers need some basis for making instructional decisions with regard to the substantive content of global education. The use of principles and generalizations from human ecology, coupled with the factoring of current issues that are critical to global well-being, results in a conceptual menu that is adaptable to any learning environment. Such a scheme projects systematic relationships rather than simplistic linear thinking. In conclusion, an ecological approach to global education can be justified because of it's organization and content.

Figure 1

A Working Flow - Chart for theConcept of Deforestation



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